



# University of Minnesota

computer matched carpool report

# **University of Minnesota computer-matched car pool report**

*Minnesota State University*

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# **Introduction**

The vast number of cars converging on the campus each day is an experience with which the entire University community is familiar. Due to the commuter orientation of the University and its location between the Minneapolis and St. Paul downtown areas, this number has made the University one of the major traffic generators in the Metropolitan area. As a major generator, the University is faced with the problems of high traffic volumes, traffic congestion at peak hours, over burdened parking facilities, and valuable land resources given over to parking ramps and surface lots. These problems are compounded by the fact that 60% of the vehicles entering the campus each day carry only one occupant. As these commuter problems intensify, the need to find solutions becomes more critical.

Solutions to the University's commuter problems, however, must be placed in the context of both the long and short range. Long range solutions will be dependent upon two major developments--a Metropolitan-wide rapid transit system and new housing to be built on or near the campus. Although extensive planning and some implementation has taken place with regard to these developments, completion is not expected until some time in the 1980's. Until that time, the University will have to supply short range solutions which rely on the creative use of available technology. This means a continued reliance on the bus and the private automobile. The Metropolitan Transit Commission is already making improvements in their hardware and re-evaluating the role it will play in the total commuting picture. New programs such as the University Express Bus System which is presently operating, dial-a-bus and express bus lanes will help to ease the pressure on existing facilities and reduce the volume of traffic entering the University. However, regardless of improvements in the bus system, it is a generally accepted fact that the private automobile will still dominate the roadways in the 1970's and into the 1980's.

With the automobile as a given, the challenge is to increase the number of occupants per vehicle, or in other words, to promote car pooling. The idea of the car pool is not new. It is already being used informally by a number of University commuters, and organizations here and elsewhere are working to institutionalize car pool systems.

The following report first examines several recent experiments with car pool systems, carried out in both the public and the private sector. The second section presents an analysis of a detailed car pool survey of University students, faculty, and Civil Service staff. The final section is a guide to designing and implementing a permanent car pool system at the University of Minnesota, with recommendations and suggested sources of funding.

## **Summary**

Although traffic congestion and limited parking facilities have prompted numerous institutions and businesses to develop car pool systems, their success to date has been limited. In order to help determine why these systems did not succeed, a car pool survey was taken among University students, faculty and staff. It was also hoped that the results of the survey would help lay the groundwork for a complete University car pool system.

Of those surveyed, nearly one-third stated that they would be willing to car pool, but do not at the present time. The majority indicated that they do not car pool now because they do not know anyone with whom to car pool. Conversely, active car pool members are typically friends or acquaintances of their fellow riders.

From the survey it would seem that the primary task in establishing a successful car pool system is the development of an effective matching procedure. This procedure should be geared to the needs of the individual commuter, and avoid the impersonal blanket matching approach which is normally used.

The Personalized Computer Matching procedure starts with the individual and his address and seeks out eight to ten matches on the same or adjacent census blocks. This approach minimizes the extra time and distance required to assemble a car pool, and once established it may be applied to Metropolitan-wide commuting problems.

It is recommended that implementation costs be assumed by the University, and development and demonstration costs be sought from Federal and/or local sources.

# **Experiments in Car Pooling**



### Federal Government

The Department of Transportation and the General Services Administration in Metropolitan Washington, D.C. have both investigated and in the case of the General Services Administration, implemented a car pool system.

The Computer Services Division of the Department of Transportation recently completed a computerized program for matching riders to car pools and existing forms of mass transit (private buses). The system is based on a grid of 960 squares superimposed on a map of Metropolitan Washington.

Urban Planning Division employees, who made up the test group, were asked to complete forms requesting their name, address, etc. and the grid number they reside in. Once this data is collected, it will be processed by Computer Services on a test run basis. No active car pool service is contemplated at the present time.

The General Services Administration has long been concerned with the parking problems at its installations. In order to promote car pooling, the department in the past has issued special parking permits to car pool participants. This relatively informal system has recently been expanded and formalized into a graduated point system for car pool registration and space allotment. Under the system, each applicant for a car pool parking permit is awarded five points as the first member of a car pool. The second, third, and fourth members are awarded from five to fifteen points. Any additional members are awarded twenty points each.

This system was put into effect in December of 1971 and is operating at the present time.

### State Government

The Minnesota Highway Department recently applied for a \$27,000 Federal Grant to finance a car pool demonstration project in the State Capitol Complex. Under the proposal, the Metropolitan area would be divided into already established Data Collection Zones, which become the basis for a car pool match.

The unique factor of this proposal is the mode of transportation selected. Instead of private automobiles, government-owned 10-12 passenger vans would be utilized. Each van would have a permanent driver and alternate and operate on a neighborhood mini-bus system. Since the proposal requires a substantial capital outlay to purchase, insure and service the vehicles, the grant was to be applied to the purchase of five demonstration vehicles.

Although the grant has since been turned down by the Federal Government, the proposal remains as a possible alternative for future consideration.

### Private Business

In an attempt to alleviate traffic congestion, the Prudential Insurance Company in Boston, Massachusetts has established incentives for car pooling. Prudential offers its 160 basement parking spaces only to employees who share rides. Some 600 employees have formed car pools and are enjoying the benefits of lower commuting costs and companionable travel.

With the same intent of reducing traffic congestion, the Connecticut Department of Transportation is developing a car pool matching system in cooperation with the Univac Division of Sperry Rand in Hartford, Connecticut. State government employees will be used as the test group, with employees of other major Hartford firms to be added if the program is successful. Project sponsors hope to increase the number of riders per car from 1.5 to 3.

### Universities

The University of Missouri-St. Louis and the University of Minnesota are both urban campuses serving large numbers of commuter students. Up to the present time each institution has approached car pooling as an answer to commuter problems on a different basis - the University of Missouri has established a computerized car pool system, while the University of Minnesota has maintained a very informal and uncoordinated car pool system.

The computerized car pool system which was developed at the University of Missouri emerged from a deliberate effort to actively encourage student participation in the campus community. The initial project was in the form of a student services study and sought to fulfill a variety of student needs, including the need to commute to and from the campus area.

As the system developed, postal zip codes were selected as a logical geographic unit for matching prospective participants. Students who wished to take advantage of the system filled out a simple form, stating their name, address, zip code, their hours on campus each day, and indicating whether they would drive, ride or both. After the forms were collected, they were tabulated and processed at the University computer center. Based on computer comparisons, a letter was written to each of the applicants either informing them that there were no successful comparisons or providing them with the name, address, telephone number, and hours on campus of all the successful comparisons.

The Missouri system experienced a promising beginning in the Winter Semester of 1969. Car pool forms were distributed with registration materials and 686 students applied for the service. A number of students who lived outside of the Metropolitan area had to be excluded for technical reasons, however, 97% of the applicants were processed. Of that group, 92% were successfully matched with an average of nearly 20 other students. Most of these matches were for one way trips.

Since the initial experiment, interest in the system has declined sharply. Only 178 students applied for the car pool service in the fall of 1971. The major reasons for this decline are the overall growth and identity problems being experienced by the rapidly expanding campus. Nevertheless, Missouri's car pool system is a pioneering attempt to use creative and insightful thinking to solve commuter problems at a large urban university.

As opposed to the University of Missouri, the University of Minnesota, with a long history as a commuter University, has done relatively little to encourage car pool formation. This is especially unfortunate since the University has the administrative structure, the parking facilities, good campus-wide communications, and the technical and computer research facilities that are all considered to be essential prerequisites to successful car pool formation.

At the present time, the University maintains two weak and uncoordinated car pool programs. These programs both began about five years ago and are virtually unknown and unused today. The first is a voluntary registration procedure in the commuter lounge at Coffman Memorial Union. There, a student may fill out a card supplying his name, address, phone number, and hours on campus each day. In addition, the student determines which commuter origin zone he resides in by referring to a map of the Metropolitan area, which has been divided into 108 zones. He then places his card in one of the two index files, one for those who are willing to provide rides and the other for those seeking rides. To date this program has not been a success. At present there are only 84 subscribers - 31 who will give rides and 53 who want rides. Unfortunately, these people are dispersed throughout 71 zones which makes matching virtually impossible.

The second program consists of limited parking privileges at Lot 33 on Fourth Street and 17th Avenue. This block-size lot with a capacity of 430 cars is set aside each morning until 9 o'clock for the exclusive use of cars with three or more occupants. These vehicles are still required to pay the full parking fee, but are assured of a space near the campus. The success of this program has been limited.

The lot is rarely half-filled by 9 o'clock and often as few as fifty or sixty cars take advantage of the lot. A part of the low usage of this lot by car poolers may be due to a lack of publicity. In any case, the two programs described above have largely failed in their attempt to diminish the volume of private vehicles entering the campus each day.

The general lack of success of the programs described here is clear; however, the reasons behind it are not as apparent. Some suggest that it may be the very nature of the car pool, and the sacrifice of autonomy. As a car pool member, one is required to operate from a group rather than an individual schedule, spend time in car pool formation and surrender a certain amount of mobility and privacy. The degree to which each of these factors affects personal decisions was unknown however, and little data was available on the habits and characteristics that make the commuter, especially the University commuter, unwilling to car pool in greater numbers. As a consequence, a study was undertaken to determine some of the answers.

# **University Car Pool Survey**

In February and March of 1972 a survey was conducted among University students, faculty, and Civil Service staff. The goal was to gain new insights into personal commuter habits and characteristics that would help lay the groundwork for a complete University car pool system.

For purposes of analysis, respondents were classified by their attitude towards car pooling. Twenty-three percent of those surveyed are members of active car pools; 32% are willing to car pool, but do not at present; and 37% are unwilling to car pool under any circumstances. The percentage of respondents in the middle group is indeed significant, indicating that the University has the potential numbers necessary for the development of a successful car pool system. Furthermore, the sizable group that is already car pooling is a vital asset and holds the potential for being expanded in terms of average number of riders per car.

After the respondents were divided into the three categories, they were compared on the basis of several characteristics. Active car pool members tended to be young, 50% being under 21 and an additional 30% in the 21-30 age group. The majority are undergraduates (70%), with graduate students, faculty, and staff each accounting for an additional 10%. Nearly 60% are women. Two-thirds of the active car poolers earn less than \$3,000 a year.

Potential car poolers exhibited characteristics very similar to active car poolers, with the exception of age. The majority of potential car poolers are 21-30 years of age, while approximately one-third are under 21.

Those individuals who are unwilling to car pool are distinctly different from the preceding. Only 23% are under 21, and while there are a number of lower income people, 25% have yearly incomes of \$12,000 or more. In addition, 63% of the respondents in this group are male. A further characteristic which differentiates this group is their clear reluctance to share their vehicles with others. Fifty percent indicated that they would be unwilling to share their car with any University member, even if they had the option of choosing a preferred status (undergraduate, graduate, faculty, or staff) for the other occupants. This contrasts sharply with 60% of the active and 70% of the potential car poolers, who are willing to share with all groups. In addition, 97% of the potential car poolers indicated that they would not hesitate to ride with people from different social and economic backgrounds. Potential car poolers would also sacrifice a substantial amount of time in order to car pool. Sixty percent would give up 10 to 20 minutes; 20% would give up 30 minutes.

With such a substantial number of people willing to car pool, there is the potential for developing a car pool system. In order to develop a successful system, however, it is essential to know why people presently do not car pool. The survey revealed that among potential car poolers, nearly 70% do not car pool now because they do not know anyone with whom to form a car pool. This answer is simple, but not unexpected. Active car pool members are typically friends or acquaintances of their fellow riders. Approximately 75% indicated that they interact with the other members both on campus and on the weekends, in addition to the daily ride to and from school. Sixty percent would classify the members of their car pools as "old friends". Potential car poolers apparently do not have this advantage and under current University procedure, have little hope of finding like-minded people from their own neighborhoods.

If the University should choose to promote car pooling on the Twin Cities Campus, the first step must be a well developed matching procedure. This will have to be coordinated with a good information collection and dissemination process specifically geared to the needs of the individual commuter. In the following section a new type of computer-matched car pool system, one that can meet the demands for individual attention, is outlined along with a program of implementation.

# **Proposed University Car Pool System**

**Design**

**Implementation**

**Sources of Funding**



**Design**

The creation of a computer-matched car pool system at the University of Minnesota will first require the selection of an overall design. The one that characterizes all systems to date is the zone-based matching procedure. The commuter origin zone is the unit in which the basic comparisons take place, and are as varied as the different car pool programs. The University of Missouri-St. Louis chose the zip code, the Department of Transportation developed their own sub-division, while others could easily be created. The premise is to find a geographic sub-division that is compatible with computerization, and then attempt to mold the respondents to that pattern.

Another alternative, one that has not been explored in detail, is to begin with the individual. The zone-based systems have proven to be largely ineffective, and are repetitious of the many impersonal undertakings of the University and other institutions. In this atmosphere a University-sponsored car pool program has a minimal chance of succeeding. If it is to function, the individual and his personal needs must be the key variables.

A personalized computer matching procedure, unlike the other approaches, would start with the individual and build on his needs and preferences. The standard matching technique determines a person's zone and prints out all of the compatible individuals in the entire zone. At the University of Missouri-St. Louis this gave an average of nearly twenty matches for every respondent. This is a quantitative response and not necessarily a qualitative one.

The Minnesota program should de-emphasize this blanket form of match in favor of a smaller number of compatible people who live as close as possible to the applicant. The match would be made on the basis of census blocks. The applicant's address would signal the computer to seek out the corresponding census block for that address. Then the computer would begin the search for comparisons. First on the same census block, then on the blocks immediately adjacent, and so on. The procedure would continue until eight or ten individuals with compatible characteristics could be found. These would automatically be printed out by the computer on specially designed forms, along with the applicant's mailing address. In this way each applicant would receive the personalized attention he requires, with the fewer matches being far more desirable ones.

The computer program just outlined is more sophisticated than the programs currently in use. It is also more costly to develop and write, with estimates running from \$4,000 to \$5,000. However, it has a far greater chance

for success than the blanket programs. It is individual in orientation, it minimizes the extra time and distance required to assemble a car pool, and once the program is created it may be applied to metropolitan-wide commuting problems.

After the program is established, any large office or manufacturing complex in the Twin Cities Metropolitan area could easily make use of the program to provide matching services to their personnel or tenants. The State Capitol Complex, the IDS Center, perhaps the entire downtown area could adopt the system. Interest in the concept has already been expressed by the Minneapolis Planning Department and the Downtown Council. The University would be the agency to develop and test the program, with the others as subscribers or joint owners of the computer program.

The advantages of a Communiversity project of this order transcend the immediate goal of relieving congestion on campus. The project would help to better link the University to the community at large; it would help preserve the integrity of those areas immediately adjacent to the campus area; and from a very practical standpoint, it would establish a high priority for Federal funding of the computer program development.

## **Implementation**

The process of implementation for a computer-matched car pool system would be the same regardless of which type of basic design is selected. Data on applicants will have to be assembled, the computer program run, and the information disseminated. At the University this would require one procedure for the students, and another for faculty and staff.

The required information would be the same for both groups. The control card would have spaces for the applicant's name; address; zip code (for mailing purposes only); hours to and from campus each day; an indication of willingness to drive, ride, or both; groups the applicant is willing to car pool with (i.e. students, Civil Service staff, faculty, all); and the general campus destination (St. Paul, East Bank, West Bank, Health Sciences). The responses would be coded on the same card, with the card becoming the applicant's entry into the computer.

Students would receive their cards as part of their regular registration packets, and return them with their other materials when they register. The cards would be separated at this point and returned to the office responsible for the program. The faculty and staff could receive their cards with the last pay check of the previous quarter, and return them by the Campus mail system. Eventually all the data would be assembled in the project office.

It is recommended that the office in charge of the car pool program be one in a position to coordinate this system with other commuter services. In the present University structure, the Transportation Operations Office would seem to be the appropriate place. When the program is instituted, this office (or any other office selected) should be given control of the computer program, and be in charge of collecting and disseminating the applicant data.

To insure a completely successful system that takes full advantage of the substantial number of potential participants, certain incentives should be offered. In the experiments outlined earlier some type of parking preference was generally used. The University already grants limited parking privileges to car poolers at Lot 33, but this benefit is unpublicized and unused. If a system is developed to increase car pooling, the existence of this lot and its location should be a part of an overall advertising campaign.

Implementation costs exclusive of the initial computer program development, can be figured on a quarterly basis. In the case of 5,000 responses, costs would be as follows:

|  |                 |
|--|-----------------|
| 55,000 computer cards<br>(total campus population)   | \$75.00         |
| Key punching (8,000 characters/hour)                 | \$300.00        |
| 90 characters/card (450,000<br>characters) Verifying | \$300.00        |
| Return form 2¢ each                                  | \$100.00        |
| Computer time (\$20/hour)                            | \$50.00         |
| Stamps (8¢)  | \$500.00        |
| Staff 80 hours (\$3.00/hour)                         | <u>\$240.00</u> |

TOTAL \$1,565.00 per quarter

Implementation costs could be met in several ways. They could be paid entirely by the participants in the form of a fee charged at registration, or they could be shared by the participants and the University. Participants could pay a small fee, for example 10 cents, with the rest of the costs coming from University funds. The third alternative is for the University to cover all implementation costs. This is the recommended approach since it tends to encourage participants, rather than to penalize them for providing a service which would benefit the entire community.

The cost differential of running the personalized computer matching program versus zip code blanket matching is listed below:

#### Two Alternative Programs

##### Personalized Computer Matching (Proposed System)

###### One Time Costs:

Computer Program: Estimate of \$4,000 to \$5,000  
(To be written by the Hybrid  
Computer Laboratory, Space  
Sciences Center)

Implementation: (5,000 responses) \$1,500 to \$1,600

##### Zip Code-Blanket Matching

One Time Costs: Programming (\$7-9/hour) = \$360.00 (40 hours)  
Analyst (\$8-10/hour) = \$100.00 (40 hours)

TOTAL \$460.00

Implementation: (5,000 responses) \$1,500 to \$1,600

## **Sources of Funding**

Potential sources of funding for development and demonstration of a computer-matched car pool system at the University might be available from both Federal and local sources. Response will depend to a very great measure on the basic design selected, and the enthusiasm with which funds are pursued. It is clear that if the University should select a zone matching system of any kind, funds will not be forthcoming. These programs have little if any value as new applied research, and with their limited success both in obtaining funding and as functioning systems, they have failed to prove their worth.

Personalized Computer Matching, however, will add both to applied computer research and may potentially relieve some of the congestion on campus. Costs for this system can be divided into two parts: Development and demonstration, and implementation. Implementation costs should be expected to come from University sources, following one of the alternatives outlined earlier. Development and demonstration costs might be obtained either exclusively from outside sources, or jointly financed with some University help.

A number of possible outside sources were investigated. There are several Federal programs which might be able to provide funds for the development and demonstration stage. The National Science Foundation has two possible sources: 1) Urban Engineering Problems, 1970-72 (\$2,000,000), and 2) Municipal Systems, Operations and Services, 1970-72 (\$7,000,000). These programs do stress technical rather than social research, but they also emphasize programs that would be of immediate benefit to a Municipal System.

A second Federal source, more appropriate than the National Science Foundation, may be available by 1973. In his 1973 Budget message President Nixon requested \$5,000,000 for University-Community research in transportation problems. Programs to qualify must demonstrate that their research will be applied to meet community transportation needs. A computer-matched car pool system such as the one proposed for the University would seem to fulfill this criterion. If funds from current programs are unobtainable, this source should be kept in mind.

A final means of obtaining Federal funding might be to apply through an existing University of Minnesota-Department of Transportation program. The University is currently a recipient of a \$148,000 Urban Mass Transportation Act University Research and Training Grant. This program provides funds for a variety of research activities in urban transportation (see Appendix), and is being jointly administered by the Departments of Mechanical Engineering, Civil Engineering, and Geography. Urban Mass Transportation officials have suggested that a funding request for a computer-matched car pool system be submitted as part of the University's overall proposal. Requests are reviewed periodically and the University's grant will soon be up for renewal.



In the absence of Federal funding, local alternatives may have to be found. One possible source is the State. The Minnesota Highway Department has already been active in car pooling, as evidenced by their unsuccessful Federal application. Since the University and the Highway Department have a similar goal of relieving traffic congestion they may be able to cooperate on a joint program, financed by the State of Minnesota. A letter outlining this type of proposal has already been sent to the Highway Department.

A cooperative effort on the part of business, government, and the University would be another alternative. In this case the University would be the development agent, with nine or ten subscribers each paying a fraction of the cost and sharing in the ownership of the program.

## **Appendix**

## CAR POOL SURVEY

The car pool survey was conducted under the auspices of the University Office of Physical Planning. Principle funding was provided by the Center for Urban and Regional Affairs. Professor Brian Aldrich of the University's Sociology Department offered professional guidance.

Survey participants were selected from zip codes 55410 (South Minneapolis) and 55436 (Edina) by means of a stratified random sample of students, faculty, and Civil Service staff. Questionnaires were sent to a total of 559 people, 409 in South Minneapolis and 150 in Edina. Returns yielded a response rate of 47% and 36%, respectively. The overall response rate was 44%.

FOR ZIP CODE 55410

3 February 1972

Dear Commuter,

The Survey you are being asked to complete is in connection with a project I am doing as an undergraduate intern at the University of Minnesota. It is part of a study laying the groundwork for a computerized car pool system for the faculty, staff and students at the University. I am trying to learn about the basic attitudes of the University community towards the car pool, and the sharing of the automobile in general. The end result of such a study will hopefully be a practical method of encouraging car pools, thus relieving pressure on the University's parking facilities and making life a little more pleasant for us all!

Please fill out and return the questionnaire in the enclosed envelope. Just drop the envelope in any CAMPUS MAIL container and it will be returned FREE. The number on the envelope is just a technical procedure to allow me to follow up on the people who do not answer. Once I have received your response, the envelope will be discarded and your questionnaire will remain anonymous.

Thank you for your assistance. I hope the entire University will benefit from your cooperation.

Sincerely yours,

*Steven Shapiro*

FOR ZIP CODE 55436

7 February 1972

Dear Commuter,

What you have just received is a two-part survey I am conducting as an undergraduate intern at the University of Minnesota. It is part of a study laying the groundwork for a computerized car pool system for the faculty, staff, and students at the University. I am trying to learn about the basic attitudes of the University community towards the car pool, and the sharing of the automobile in general. The end result of such a system will hopefully be a practical method of encouraging car pools, thus relieving pressure on the University's parking facilities and making life a little more pleasant for us all!

The first part is a two page questionnaire which should be completed by all. The third sheet is only for those who wish to join a car pool at the present time. Everyone should complete the first two pages, and the third only if you wish. Return the survey by putting it in the enclosed envelope and dropping it in any CAMPUS MAIL container, and it will be returned FREE. The number on the envelope is just a technical procedure to allow me to follow up on the people who do not answer. Once I have received your response, the envelope will be discarded and your questionnaire will remain anonymous. Thank you very much for your assistance.

Sincerely yours,

*Steven Shapiro*

CAR POOL QUESTIONNAIRE

- 1) Do you presently own an automobile?

Yes \_\_\_\_\_ No \_\_\_\_\_

- 2) Do you have access to an automobile for at least one school day a week?

Yes \_\_\_\_\_ No \_\_\_\_\_

- 3) Indicate all the groups you would be willing to share a car pool with.  
(Check all appropriate responses).

None \_\_\_\_\_ Faculty \_\_\_\_\_ Undergraduate \_\_\_\_\_

All \_\_\_\_\_ Civil Service \_\_\_\_\_ Graduate \_\_\_\_\_

- 4) I would prefer a car pool which is (check one).

All Male \_\_\_\_\_ All Female \_\_\_\_\_ Male and Female \_\_\_\_\_

- 5) What in your opinion, is the ideal size of a car pool? (Circle one).

2   3   4   5   6   more

- 6) Regardless of if you own a car, how willing would you be to car pool with people who are different socially and economically from you?  
(Check one).

Very willing \_\_\_\_\_

Willing \_\_\_\_\_

Unwilling \_\_\_\_\_

Very unwilling \_\_\_\_\_

- 7) How much time, over and above your average commuting time, would you be willing to spend in order to be a member of a car pool? (Circle number of minutes).

0   5   10   15   20   25   30   more

- 8) On an average day, excluding picking up other passengers, how many places do you stop while going from your residence to the University and back again? (Check one).

0   1   2   3   4   5   more

- 9) Are you presently participating in a car pool of some sort?

Yes \_\_\_\_\_ No \_\_\_\_\_

IF YOU ANSWERED YES TO QUESTION NINE:

- 10) How many people including yourself, are participating in your car pool on a regular basis? (Circle one).

2    3    4    5    6    more

IF YOU ANSWERED YES TO QUESTION NINE:

- 11) Is your car pool (check one).

All Female \_\_\_\_\_ All Male \_\_\_\_\_ Male and Female \_\_\_\_\_

IF YOU ANSWERED YES TO QUESTION NINE:

- 12) Do you see other members of your car pool on Campus during the day?

Always \_\_\_\_\_

Often \_\_\_\_\_

Sometimes \_\_\_\_\_

Seldom \_\_\_\_\_

Never \_\_\_\_\_

IF YOU ANSWERED YES TO QUESTION NINE:

- 13) Do you see other members of your car pool on weekends? (Check one).

Always \_\_\_\_\_

Often \_\_\_\_\_

Sometimes \_\_\_\_\_

Seldom \_\_\_\_\_

Never \_\_\_\_\_

IF YOU ANSWERED YES TO QUESTION NINE:

- 14) Why do you car pool? (Check all responses that apply to you).

\_\_\_\_\_ It is cheaper.

\_\_\_\_\_ It is easier to find a parking space.

\_\_\_\_\_ I don't like to drive everyday.

\_\_\_\_\_ I like company when I drive.

\_\_\_\_\_ The members of my car pool are mostly old friends.

\_\_\_\_\_ It is the only way I can get to school.

IF YOU ANSWERED YES TO QUESTION NINE:

15) Does your car pool share costs?

Yes \_\_\_\_\_ No \_\_\_\_\_

IF YES HOW? (Check all appropriate responses).

\_\_\_\_\_ The riders pay for both gas and parking.

\_\_\_\_\_ The driver pays for both gas and parking.

\_\_\_\_\_ The riders pay for parking, the driver for gas.

\_\_\_\_\_ The driver pays for parking, the riders pay for gas.

\_\_\_\_\_ The riders each pay a set fee.

\_\_\_\_\_ The driver for the day pays all expenses, and the members of the car pool take turns driving.

IF YOU ANSWERED YES TO QUESTION NINE:

16) Do you now, or will you at any time in the future, wish to participate in a car pool to and/or from the University Campus?

Yes \_\_\_\_\_ No \_\_\_\_\_

IF YOU ANSWERED YES TO QUESTION NINE:

17) Do you know of people you can car pool with?

Yes \_\_\_\_\_ No \_\_\_\_\_

IF YES, THEN WHY DON'T YOU CAR POOL? (Check all appropriate responses).

\_\_\_\_\_ I don't like other people around when I drive.

\_\_\_\_\_ I need the use of my car during the school day.

\_\_\_\_\_ I don't like the people I would have to car pool with.

\_\_\_\_\_ I usually have to stop at other places while going to and from the University Campus.

18) How would you classify your status at the University? (Check one).

Faculty \_\_\_\_\_

Undergraduate \_\_\_\_\_

Civil Service \_\_\_\_\_

Graduate \_\_\_\_\_



19) What is your age? (Check one).

Under 21 \_\_\_\_\_ 21-30 \_\_\_\_\_ 31-40 \_\_\_\_\_

41-50 \_\_\_\_\_ Over 50 \_\_\_\_\_

20) What is your income? (Check one).

\$0,000 to 2,999 \_\_\_\_\_ \$3,000 to 5,999 \_\_\_\_\_ \$6,000 to 8,999 \_\_\_\_\_

\$9,000 to 11,999 \_\_\_\_\_ Over \$12,000 \_\_\_\_\_

21) What is your sex?

Male \_\_\_\_\_ Female \_\_\_\_\_

22) How often do you hitchhike? (Check one).

Always \_\_\_\_\_

Often \_\_\_\_\_

Sometimes \_\_\_\_\_

Seldom \_\_\_\_\_

Never \_\_\_\_\_

23) How often do you pick up hitchhikers? (Check one).

Always \_\_\_\_\_

Often \_\_\_\_\_

Sometimes \_\_\_\_\_

Seldom \_\_\_\_\_

Never \_\_\_\_\_

THANK YOU FOR COMPLETING THIS SURVEY!!

Urban Mass Transportation Act University Research and Training Grant

UNIVERSITY OF MINNESOTA  
Minneapolis, Minnesota

Program No: URT-36 (70)

Fed'l Grant: \$148,000

RESEARCH PROJECTS

- .Problems of Urban Transportation
  - a. Studies of Command and Control in Urban Transportation Systems.
  - b. Study of the Dynamics of Interaction Points Coupling Transportation Modes.
- .Other Problems in Urban Mass Transit
  - a. User Preference for Mass Transit in the Twin Cities Metropolitan Area: A Basis for Planning and Political Decision.
  - b. Quantification and Justification of Mass Transit Subsidies.
  - c. Research on Personalized Transit Systems.
- .Forecasting Future Transportation Demands
  - a. Forecasting Demand for Transportation and the Relationship to the Design of Transportation Facilities.
  - b. Forecasting Area Demand for Suburban Mass Transportation.

COURSES SUPPORTED BY THE PROGRAM

- .Workshop in Interdisciplinary Design (for local transportation officials).

STUDENT STIPENDS

Fellowships:  
(1970-71) approximately 6

Research Assistantships:  
(1970-71) 6 positions

PARTICIPATING SCHOOLS AND DEPARTMENTS

.Civil Engineering Department

.Mechanical Engineering Department

.Geography Department

.School of Business Admin.--  
Management and Transportation

.Electrical Engineering Department

.Economics Department

.Political Science Department

.Sociology Department

#### PARTICIPATING FACULTY

Daniel L. Gerlough--(Program Director), Department of Civil  
Engineering

Russell B. Adams--Geography Department

Sant R. Arora--Mechanical Engineering Department, (Industrial  
Engineering)

John Edward Anderson--Mechanical Engineering Department

Frederick J. Beier--Graduate School of Business Administration

John R. Borchert--Center for Urban and Regional Affairs

John Edward Brandl--School of Public Affairs

Dr. D. Frohrib--Mechanical Engineering Department

Donald Victor Harper--Graduate School of Business Administration--  
(Transportation and Logistics)

Matthew J. Huber--Department of Civil Engineering

Warren Ibele--Mechanical Engineering Department

K. S. P. Kumar--Department of Electrical Engineering

Herbert Mohring--Department of Economics

Thomas M. Scott--Political Science Department

#### ADVISORY COMMITTEE

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John E. Brandl--Director, School of Public Affairs

Donald V. Harper--Chairman, Department of Management, Production  
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Administration

Warren E. Ibele--Associate Dean, Graduate School

Fred E. Lukermann--Assistant Vice President, Academic Admin.

Richard A. Swalin--Associate Dean, Institute of Technology

John G. Turnbull--Associate Dean, College of Liberal Arts

Sub-Committee On Research: W. E. Ibele, R. A. Swalin, J. G. Turnbull

Advisor on Fellowship Matters: E. W. McDiarmid--Director, Graduate School  
Fellowship Office

Administrative Committee

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School of Business Administration

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Warren E. Ibele--Associate Dean of the Graduate School and  
Professor of Mechanical Engineering

K. S. P. Kumar--Associate Professor of Electrical Engineering

Herbert Mohring--Professor of Economics

Thomas M. Scott--Associate Professor of Political Science

PROGRAM DIRECTOR

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## Sources

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